

The Mineral Industry of Burma

By Gordon L. Kinney¹

Burma's current mineral output was small by world standards, although Burma was a producer of some consequence before World War II and still is considered to have a good potential for expansion. Burma's major minerals included lead and zinc, which came mostly from the famed Bawdwin mine, once the richest lead-zinc lode mine in the world but now mining much lower grade material. Tin and tungsten production was important and came from a variety of small-scale placer and lode mines and few larger Government-owned mines. Burma was one of the few Southeast Asian countries to produce sufficient petroleum and natural gas to meet its domestic needs, and there was a small amount of crude oil exported in 1979. Burma also produced excellent quality jade and other gem minerals.

About 67,000 persons, or 0.5% of the active labor force, were employed in mining activities at the beginning of 1978, and 68,000 during 1979. These miners accounted for approximately 1.8% of the net output of goods and services. Burma's mineral industry was managed primarily by four state-owned corporations. The No. 1 Mining Corp. controlled the lead, zinc, and silver output, which came mostly from its Bawdwin mining operation. It will also run the Monywa copper enterprise. The No. 2 Mining Corp. ran all the major tin and tungsten operations and the Heinze dredging project. The No. 3 Mining Corp. mainly was in charge of the Kalewa and Namma coal mines and the Moulmein and Loikaw antimony mines. The industrial minerals such as barite, limestone, and gypsum were managed by the No. 4 Mining Corp. The No. 3 Corp. was given the responsibility for the planned direct-reduction steel plant in 1979.

The Government's policy in running these mines was that no foreign investment was accepted, and the mines would have no special marketing arrangements with foreign corporations or governments. As a result, very little foreign capital has been available for developing new mines or for modernizing or expanding old ones.

The Government's third 4-year plan, beginning in FY 1978-79, stated that the fullest possible utilization of natural resources was necessary in order to attain the desired economic goals. It mentioned that certain projects may require capital or technical know-how beyond the means of the state. "In such cases, mutually beneficial economic cooperation with foreign enterprises public or private will be considered for specified periods, provided they are not detrimental to the Socialist system."² How much of an effect this apparent change will have on the investment climate remains to be seen.

It was planned that some old mines would be reopened, and some of the operating mines would be modernized and expanded with the help of foreign aid donations and loans. Security problems near the mines have been a deterrent to large-scale foreign loans in a few cases. However, although problems still exist in some areas, others have been alleviated, and the overall security situation was somewhat improved.³ The security situation has also been a factor in exploration for new deposits in geologically favorable areas of Burma. The detailed ground surveys and drilling needed for resources exploration and development have not been conducted in some areas. The Department of Geologic Survey and Mineral Exploration (GSE) made no major discoveries during the year. However, the GSE

was expected to increase its fieldwork during 1978 and 1979, after several years of relatively low activity and expenditures.

Gross national product (GNP) for FY 1978-79 was estimated at just over \$4 billion at current prices.⁴ The revised figure for the previous year was \$3.9 billion. GNP at constant 1969 prices was \$1,807 million in FY 1977-78 and \$1,825 million in FY 1978-79. The chronically high inflation rate appeared to have taken a turn for the better as the Rangoon consumer price index (1972=100) declined about 4% for the year to 246. Overall exports were reported to be \$294 million and imports increased to \$477 million in FY 1978-79.⁵ The balance of trade reflected the increase in imports and jump-

ed from a \$70 million deficit in FY 1977-78 to a deficit of more than \$180 million in FY 1978-79. The mineral sector was a small part of Burma's GNP and trade volume, and not comparable to the agricultural sector in importance.

In 1978, the weather conditions were ideal for the rice crop, the most important product of Burma's highly agricultural economy. Burma escaped the late-season floods which hit neighboring countries, and estimates indicate a record paddy harvest, possibly as high as 10 million tons versus less than 9 million tons in 1977. Rice was the major export item and foreign exchange earner and thus of extreme importance to the overall economy.

PRODUCTION

The value of the output of the mineral sector increased substantially in FY 1977-78 to nearly \$80 million at current prices.⁶ FY 1978-79 value data were not available, but the reported tonnages for calendar year 1978 for all nonfuel minerals except jadeite increased, in some cases dramatically. This across-the-board rise in production, the first in several years, was attributable to three major factors: (1) larger overall budgetary allocations for the mining sector; (2) bilateral and multilateral economic assist-

ance for mining, enabling the mining corporation to acquire new equipment and to utilize the available equipment more effectively; and (3) a Government program of "commercialism" for the mining companies providing the workers with better incentives.⁷ The Government plan for 1979-80 targeted small increases for nearly all of the important mineral products.

The most valuable mineral output of the economy was crude oil, followed by the gem minerals, tin, tungsten, and lead.

Table 1.—Burma: Production of mineral commodities

(Metric tons unless otherwise specified)

Commodity ¹	1976	1977	1978 ²	1979 ³
METALS				
Antimony, mine output, metal content -----	468	500	620	635
Copper:				
Mine output, metal content -----	92	45	56	100
Matte, gross weight -----	205	99	125	² 148
Iron and steel: Crude steel ⁴ -----	40,000	40,000	40,000	--
Lead:				
Mine output, metal content ⁵ -----	⁷ 7,100	8,900	7,200	11,000
Metal:				
Refined, including secondary -----	3,331	4,833	4,975	5,100
Antimonial lead (18%-20% Sb) -----	187	120	127	130
Nickel:				
Mine output, metal content ⁵ -----	24	17	18	18
Speiss, gross weight -----	94	69	70	² 67
Silver, mine output ----- thousand troy ounces	211	355	377	272
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Tin, mine output, metal content:				
Of tin concentrate -----	264	114	346	560
Of tin-tungsten concentrate -----	243	248	411	600
Total -----	507	362	757	1,160
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Tungsten, mine output, metal content:				
Of tungsten concentrate -----	109	108	189	290
Of tin-tungsten concentrate -----	167	170	282	410
Total -----	⁷ 276	278	471	700
Zinc, mine output, metal content -----	2,211	1,834	2,645	3,000

See footnotes at end of table.

Table 1.—Burma: Production of mineral commodities—Continued

(Metric tons unless otherwise specified)

Commodity ¹	1976	1977	1978 ^P	1979 ^e
NONMETALS				
Barite ³ -----	15,681	16,096	35,320	36,000
Cement, hydraulic ----- thousand tons	233	269	254	320
Clays: ³				
Ball clay -----	5,762	4,674	4,573	² 4,294
Bentonite -----	955	975	1,377	1,500
Fire clay ⁴ -----	2,792	4,627	4,878	² 4,717
Industrial white clay -----	4,393	3,449	2,000	² 6,876
Feldspar ³ -----	1,709	1,422	2,000	2,000
Graphite ³ -----	161	96	280	250
Gypsum ³ -----	45,296	33,511	35,431	35,000
Pigments, mineral, natural: Iron oxide -----	616	230	461	400
Precious and semiprecious stones: Jadeite ³ ----- kilograms	31,387	6,532	12,454	7,707
Salt ----- thousand tons	¹ 126	230	304	300
Stone: ³				
Dolomite -----	¹ 1,016	431	1,616	² 1,882
Limestone, crushed and broken ----- thousand tons	645	1,159	1,437	² 1,259
Quartz -----	116	73	--	² 122
Talc and related materials: Soapstone ³ -----	238	201	391	360
MINERAL FUELS AND RELATED MATERIALS				
Coal -----	20,931	23,926	33,113	² 36,064
Gas, natural:				
Gross ----- million cubic feet	13,300	16,000	17,000	18,000
Marketed ³ ----- do	8,481	8,784	12,638	13,500
Petroleum:				
Crude ----- thousand 42-gallon barrels	8,183	9,178	9,995	10,700
Refinery products: ⁵				
Gasoline ----- do	1,646	1,864	1,864	2,000
Jet fuel ----- do	216	248	² 280	300
Kerosine ----- do	1,117	909	744	540
Distillate fuel oil ----- do	2,045	2,351	2,500	2,600
Residual fuel oil ----- do	1,012	1,279	1,532	1,600
Lubricants ----- do	140	133	140	140
Other ----- do	177	179	² 223	220
Total ----- do	¹ 6,353	6,963	7,283	7,400

^eEstimate. ^PPreliminary. ¹Revised.¹In addition to the commodities listed, pottery clay, common sand, glass sand, other varieties of crude construction stone, and other varieties of gem stones are also produced, but available information is inadequate to make reliable estimates of output levels.²Reported figure.³Data are for fiscal years beginning Apr. 1 of that stated.⁴Includes fire clay powder.⁵Data exclude products used as fuel in refineries.

TRADE

The mining industry usually ranked third after agriculture and forestry products in value of exports. While detailed trade data were not available, the relative importance of the mining sector was not believed to have changed in 1978 and 1979. Burma generally exports nearly all of its nonfuel mineral output, particularly in the metallic sector. Mineral fuels were consumed domes-

tically.

There was a rise in exports of all minerals and ores, both in quality and value in comparison with 1976, the last calendar year for which individual figures were available. Overall, the estimated value of mineral exports during 1978 constituted 11% of Burma's total export earnings as against 7% in 1976.^a

COMMODITY REVIEW

METALS

Copper.—Burma and Yugoslavia signed a \$70 million loan agreement for the development of the Monywa copper project. The deposits are located just west of the Chindwin River, opposite the railhead town of Monywa. The main deposits are in the

Kyesintaung and Sabetaung ranges. The Kyesintaung deposit contains 55 million tons grading about 0.5% Cu, and the Sabetaung deposit, 26 million tons grading just over 1.02% Cu.^a Open pit mine workings will be scaled to produce 2.4 million tons per year of ore. The ore will be processed in a flotation plant with a capacity of 60,000 tons

per year of concentrate containing 22% to 25% Cu. Related infrastructure will also be established. Design and technology will be supplied by RTB Bor, Yugoslavia's copper mining and smelting conglomerate, together with other Yugoslavian firms. The Yugoslavians will build the plant and assist the Burmese in the early stages, but the Burmese officials will be in full charge of management and operations. Much of the excavation hardware reportedly will be supplied by American manufacturers or their licensees. The concentrate will be exported. Construction on the concentrator was scheduled to begin in early 1980 and the entire contract was to be completed within 4 years. The agreement did not include the building of a copper smelter and refinery, which were still in the planning stage.

Currently the country's copper production ranges from 100 to 200 tons per year of copper matte, obtained as a byproduct from the Namtu lead smelter.

Iron and Steel.—In July 1979 the No. 3 Mining Corp. reportedly signed a turnkey contract with Italy's Danieli & C. Spa. for a 20,000-ton-per-year Kinglor Metor direct reduction plant, a 15-to 17-ton electric arc furnace, and for metal casting equipment. Provision for later expansion included a continuous billet casting machine. The total cost of the contract was valued at DM33 million. The plant will be located at Anisakan in Maymyo township.

Lead and Zinc.—Most of the lead and zinc concentrate production, valued at nearly \$5 million, came from the famed Bawdwin mine in northern Shan State. Once one of the richest lead mines in the world, production had been hindered by declining ore grade and deteriorating mine and plant facilities. The decline in ore grade was a relative one as the run-of-mine ore averages over 10% combined metal content. Earlier high-grade ore veins were mined selectively at over 40% metal content. However, in 1978, the nearly 225,000-ton ore production was the highest since 1970 because grants and credits from the Federal Republic of Germany (FRG) enabled the No.1 Mining Corp. to acquire new equipment and rehabilitate the existing plant. Modernization of the workshop with a DM5 million grant was completed, and the improved facility was operating at yearend 1978. Updating the workshop was critical because spare parts for the 65-year-old equipment and facilities were difficult to obtain and trans-

portation to the mine was subject to attack by insurgents and bandits. Virtually all spare parts and replacements will now be fabricated in the well-equipped workshop.

The DM5 million credit obligated in 1976 for development of an open pit mine at Bawdwin had not been utilized by mid-1979. It was still planned to begin the open pit operation as soon as feasible. Conversion of Bawdwin mine to an open pit operation would generate a large increase in ore production.

The mine operates its own narrow-gage railroad, which runs from Namtu 22 kilometers west to Bawdwin and 51 kilometers east to Namyao. In 1978, the No. 1 Mining Corp. ordered 10 diesel locomotives to replace the worn out and cannibalized steam equipment which had been used for decades. The current needs were for four locomotives, but the remainder will be needed as ore production is increased over the next 2 years. This approval to procure capital equipment in advance of immediate needs was unprecedented among Burmese Government agencies.

Plans for the zinc smelter slated for Pynmana, to be beyond the reach of insurgents, have been dropped. FRG-financed feasibility studies, to utilize the huge quantity of lead and zinc tailings and slag accumulated over the past 65 years at Bawdwin, were planned. One study will consider the production of zinc oxide clinker from the zinc-rich smelter slags by the Waelz process. The second will examine the possible recovery of silver by a leaching process from the lead-zinc flotation plant tailings. The studies were scheduled for completion by yearend 1980.

Tin and Tungsten.—These were the most valuable metallic minerals produced in Burma with exports totaling over \$12 million in 1978. The major mines were at Heinda, Kanbauk, Myinmatti, Natsan, and Yadanabon. Numerous small-scale private mining operations sell their output to the Government and contributed more than one-half of the total concentrate. Unstable conditions, however, permit considerable illicit tin and tungsten mining with the output being smuggled out of Burma to Thailand, Malaysia, or Singapore.

Production of tin and tungsten concentrates increased substantially for the second straight year, partly because of the production from the modernized Heinda tin mine

and concentration plant. Heinda was the country's largest tin producer, turning out approximately 500 tons in 1978. The new mill ran into problems with ore characteristics that were not anticipated in the design of the plant. As a result, the FRG was to provide additional funding for modifications which will permit recovery of extremely fine-grained cassiterite not encountered in previous run-of-mine ore. The plant was designed to produce 1,000 tons of 72% tin concentrate per year.

The Government's FY 1979-80 plan called for another increase in tin and tungsten production. Preliminary production data for the first three quarters of 1979 indicate output of the concentrates and mixed tin-tungsten concentrates did indeed increase substantially over the same period in 1978.

Exploration was still underway at the Hermingyi underground tin mine. A study was to be made to determine if further development work was worthwhile.

The rich tin-tungsten deposits along the Tennassarim coast in south Burma were still not being efficiently exploited during 1978 and 1979. However, work was underway and orders were placed for all of the major equipment needs under the tin-tungsten expansion project funded by a \$16 million International Development Association credit. This project was designed to exploit the alluvial deposits in the shallow offshore areas. The new dredge and processing equipment will not be available until late 1980.

NONMETALS

Overall, the industrial mineral sector had a particularly good year in 1978. Limestone production jumped in response to increased demand from the new Kyangin cement plant and various construction projects. The capacity of the new cement plant was not announced, and it was unclear how much of the 340,000 tons produced in 1978 came from the new plant or how many other plants contributed to the total. The Government plan proposed cement output at 400,000 tons for FY 1979-80. Barite output more than doubled in 1978, reflecting an increase in domestic and foreign oil well drilling. The plan target called for another substantial increase in barite production to 47,000 tons in FY 1979-80. Graphite, industrial clay, and dolomite each more than doubled the 1977 tonnages in 1978, and all other reported industrial minerals showed increases over those of the previous year. Brick and tile production also reflected an

increase in construction activity during the year. Production was planned at over 150 million units for FY 1979-80, probably equating to around 350,000 to 400,000 tons of finished material.

Burma's Government planned to meet the fertilizer requirements of the agricultural sector in the next decade by adding a 91,000-ton-per-year N urea complex to the two 31,000-ton-per-year N urea plants already in operation, one in Pagan, the other in Sale. Like the existing units, the new plant will use natural gas as feedstock and fuel and will be located somewhere along the Irrawaddy River. The original choice of Kyungchuang was rejected because the water there was too shallow for barge transport of the product.¹⁰

In January 1978, the FRG agreed to provide a DM90 million low-interest loan as financial assistance to Burma for the construction of the new plant. Construction was reportedly due to begin about the end of 1979.

MINERAL FUELS

Coal.—Burma has few known deposits of coal and what was mined was poor quality. The main producer in 1978 and 1979 was the Kalewa coal mine where output increased for the second straight year and about doubled since 1974. The 33,000-ton overall output in 1978 was of little importance to the economy, and there were no known plans for large-scale expansion of production. The Government's target for FY 1979-80 coal production was set at about 38,000 tons. The coal, blended with high-quality imports, was consumed mainly in steam locomotives and small electric powerplants.

Petroleum and Natural Gas.—Burmese Government statistics indicated that crude oil production continued to climb in both 1978 and 1979. In July 1979 a Japanese firm signed a contract with Burma's Government owned oil company to purchase several thousand barrels per day of crude oil. The amount was to be the difference between daily production and the current capacity of Burma's refineries. Burma's ability to store oil in excess of its needs either at the oilfields or at the refineries was very limited. The first shipment arrived in Japan at the end of September 1979. The foreign exchange earned from the sale will strengthen Burma's balance of payments considerably.

Because of limited refinery capacity, motor fuels and kerosine were in short supply during 1978, particularly in northern Burma and in the outlying States. There were

reports of industrial stoppages due to lack of fuel.¹¹ The Government's firm policy of not importing petroleum was exacerbating the shortages at a time of rising demand by industry and the populace.

In order to supply the increasing needs for petroleum producers, a new 25,000-barrel-per-day refinery was being built at Mann oilfield, with financing and construction being carried out with Japanese assistance. Completion was scheduled for 1982. In addition, the 20,000-barrel-per-day Syriam refinery was slated for modernization, also with Japanese aid.

There was no offshore exploration activity in Burma in 1978 or 1979; however, in October 1978 the Government issued an invitation to foreign oil companies to submit bids on all offshore blocks, including those previously withheld for Government use. Reportedly only three firms made formal conditional responses. Lack of interest on the international oil companies' part was attributed to comparatively unattractive terms, very high data fees, and costly Government operation regulations.

Onshore exploration was conducted solely by the Government's Myanma Oil Corp. (MOC). It was not anticipated that foreign firms would be invited to participate. Exploration activity was considerably lower in 1978 than in previous years, mostly because of cuts in the MOC operating budget. There were no confirmed reports of significant finds in 1978 or 1979.

MOC took delivery of several new drilling rigs and ordered several more during 1978. The new equipment should enhance the future onshore exploration and development program.

Work was completed in April 1979 on the major pipeline connecting the Mann oilfield with the Syriam refinery near Rangoon. The final 280-kilometer section of 25.4-centimeter pipe was laid between Prome and the refinery. Completion of the line eliminated the slow and costly river barge traffic formerly used to deliver most of the crude oil to the refinery.

¹Physical scientist, Branch of Foreign Data.

²Ministry of Planning and Finance. Reports to the Pyithu Hluttaw on the Financial, Economic, and Social Conditions of the Socialist Republic of the Union of Burma for 1977-78. 1978, pp. 2, 10-11.

———. Report to the Pyithu Hluttaw on the Financial, Economic, and Social Conditions of the Socialist Republic of the Union of Burma for 1979-80. 1979, pp. 1-2, 7, 22-23.

³U.S. Embassy, Rangoon, Burma. Industrial Outlook Report - Minerals. Department of State Airgram A-32, June 2, 1979, p. 2.

⁴The Burmese fiscal year runs from April 1 to March 31. Values have been converted from Burmese kyats (K) to U.S. dollars at the average rate of FY 1977-78 K6.787 = US\$1.00; FY 1978-79 K7.184 = US\$1.00.

⁵U.S. Embassy, Rangoon, Burma. Economic Trends Report for Burma. Department of State Airgram A-007, June 14, 1979, pp. 2-3.

⁶P. 19 of first work cited in footnote 2.

⁷P. 3 of source cited in footnote 3.

⁸P. 3 of source cited in footnote 3.

⁹World Mining. V. 31, No. 13, December 1978, p. 80.

¹⁰The British Sulphur Corp. Ltd., London, England. Nitrogen. No. 116, November-December 1978, p. 27.

¹¹U.S. Embassy, Rangoon, Burma. Petroleum Outlook Report - Burma. Department of State Airgram A-14, Mar. 16, 1978, pp. 2-3.